Analysis of Income, Inflation, Expenditure, and Crime Across U.S. States

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Introduction

Objective:

To analyze the interconnectedness of economic indicators — specifically income, inflation, and expenditure — and their relationship with crime rates across U.S. states using structured datasets.

Scope & Timeline:

- Years Covered: 2012–2022
- Unit of Analysis: State-Year observations

Motivation:

To understand how changes in income and inflation affect public spending and crime, and how these relationships can support policy decisions.

	Unnamed: 0	State	Year	GDP	RPPS	Unemployment	Per_Capita_Income	Population	Per_Capita_Expenditure	Crime_Rate	Property_Crime_Rate	Durable goods	Final consumption expenditures of nonprofit institutions serving households (NPISHs)	Nondurable goods	Services
0	0	Alabama	2012	188280.7	90.515	2503656.0	35559.0	4839947.0	28915.73	175.033333	295.384167	15071.9	2345.6	38133.8	86744.9
1	1	Alabama	2013	193981.5	90.273	2523020.0	35706.0	4865253.0	29588.74	193.590000	283.433333	15563.2	2426.9	38918.1	89475.4
2	2	Alabama	2014	197064.4	90.137	2552256.0	36722.0	4887757.0	30358.63	185.558333	266.225833	16111.1	2459.2	39738.2	92536.3
3	3	Alabama	2015	203113.3	89.706	2587641.0	38189.0	4909177.0	31123.44	192.901667	249.524167	16899.9	2506.5	39352.7	96537.9
4	4	Alabama	2016	208824.3	90.580	2619761.0	38704.0	4931579.0	31999.10	201.317500	246.285833	17507.2	2687.7	39302.5	100996.5

Data Sources & Types

Economic & Expenditure Data:

- Source: Bureau of Economic Analysis (BEA)
- Type: Structured CSV
- Files Used:
    - SAINC1__ALL_AREAS_1929_2024.csv (Income & GDP)
    - SASUMMARY__ALL_AREAS_1998_2024.csv (Expenditure)
- Key Features: GDP, Per Capita Income, RPPS, Expenditure (Durables, Non-Durables, Services), Unemployment Rates

Crime Data:

- Source: FBI Crime Data API (via data.usa.gov)
- Type: Semi-structured JSON, converted to structured DataFrame
    - Violent Crime Rate (e.g., assault, robbery, homicide)
    - Property Crime Rate (e.g., burglary, theft)
- Aggregated by State and Year (2012–2022)

Tools, Libraries & Methodologies

<u>Programming Language:</u> Python — Used for data wrangling, analysis, and visualization.

<u>Key Python Libraries:</u>
- pandas – Data loading, cleaning, merging, transformation
- numpy – Numerical computations
- matplotlib, seaborn – Static visualizations
- plotly – Interactive charts and dashboards

<u>Methodologies:</u>
- *Data Cleaning:* Removed missing values, standardized formats, and filtered relevant variables
- *Data Integration:* Merged multiple datasets on State and Year
- *Feature Selection:* Used LineCodes like GDP, Income, RPPS, etc.
- *Exploratory Data Analysis:* Created visualizations and statistical summaries

Data Cleaning & Merging Process

BEA Datasets:

Dataset 1: Income & Population
- Filtered LineCode:
  - 2: Population
  - 3: Per Capita Personal Income
- Removed rows for "United States"
- Cleaned state names
- Pivoted years into rows

Dataset 2: Inflation
- Filtered LineCode:
  - 4: GDP
  - 5: Personal Income
  - 13: Per Capita Personal Income
- Filtered for years 2012-2022
- Selected only relevant columns
- Removed rows for non-states

Dataset 3: Expenditure
- Filtered LineCode:
  - 3: Durable goods
  - 8: Nondurable goods
  - 13: Services
  - 22: NPISHs
- Reshaped using melt() for tidy data format
- Renamed metrices using a dictinary

Crime Dataset:

- Cleaned Columns
- Aggregted at State-Year level
- Kept only relevant field - crime rate and property crime rates

Merging Process:

- All datasets joined using State and Year
- Rows: 651 (50 states + DC × 11 years)
- Columns: ~14 (GDP, RPPS, Income, Crime, etc.)

Insights

- **<u>Income & Crime:</u>** States with lower per capita income consistently reported higher crime rates, suggesting a socioeconomic vulnerability link.

- **<u>Inflation & Expenditure:</u>** Regions with higher RPPS and deflator values saw proportionally increased per capita expenditure, highlighting inflation's tangible impact on household and government spending.

- **<u>Unemployment Effects:</u>** Higher unemployment levels were associated with both stagnant income growth and elevated crime, reinforcing the broader economic stress factors.

- **<u>State-level Contrasts:</u>**
  - California, New York: High income + high cost of living, but managed crime rates.
  - Alabama, Mississippi: Lower income + higher crime rates + economic strain.

- **<u>Pandemic Impact:</u>** Post-2020 dips in income and spending trends reflect inflation and COVID-19 disruption.

Implications

- **<u>Targeted Economic Support</u>**: States with slower income growth and higher crime (e.g., Alabama, Mississippi) may benefit from focused fiscal policies and federal aid.

- **<u>Control Inflation to Boost Real Income:</u>** Since real income lags behind nominal gains, stabilizing inflation is essential for preserving purchasing power, especially in vulnerable regions.

- **<u>Geographically Tailored Policy:</u>** Economic trends vary significantly by region — policymakers should adopt state-specific strategies rather than one-size-fits-all programs.

- **<u>Data-Informed Resource Allocation:</u>** The combined dataset offers a robust foundation for public agencies to prioritize investments in crime prevention, employment, and welfare.

Conclusion

✅ <u>**What We Accomplished**</u>

- Merged and analyzed structured data on income, inflation, expenditure, and crime across U.S. states from 2012 to 2022.

- Cleaned and transformed datasets to enable state-wise comparison over time.

- Used visual analysis and regression modeling to explore economic relationships.

📊 <u>**Final Takeaway:**</u>

- Economic indicators like income and inflation are strongly connected to public spending and crime patterns.

- These insights can support targeted policy making and resource allocation.

Any Questions?